**Stat and Data Analysis Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Linear Transformations**

Adding/Subtracting by a Constant:

- If all values of a data set are added/subtracted by the same value:

Example:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | mean | st. dev. | Min | Q1 | med | Q3 | max | IQR | Range |
| Original | 15.2 | 2.6 | 2 | 8 | 14 | 18 | 25 | 10 | 23 |
| + 12 |  |  |  |  |  |  |  |  |  |
| − 7 |  |  |  |  |  |  |  |  |  |

Multiplying/Dividing by a Constant:

- If all values of a data set are multiplied/divided by the same value:



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | mean | st. dev. | Min | Q1 | med | Q3 | max | IQR | Range |
| Original | 15.2 | 2.6 | 2 | 8 | 14 | 18 | 25 | 10 | 23 |
| × 1.2 |  |  |  |  |  |  |  |  |  |
| ÷ 2 |  |  |  |  |  |  |  |  |  |

**Practice:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | mean | st. dev. | Min | Q1 | med | Q3 | max | IQR | Range |
| Original | 38.5 | 5.7 | 12 | 28 | 35 | 41 | 86 |  |  |
| + 22 |  |  |  |  |  |  |  |  |  |
| × 4 |  |  |  |  |  |  |  |  |  |
| × 6 − 35 |  |  |  |  |  |  |  |  |  |
| ÷4 + 27 |  |  |  |  |  |  |  |  |  |

1. A researcher finds that the mean length of a house cat's tail is 14.65 inches with a standard deviation of 1.36 inches. What would be the mean and standard deviation in cm if 1 in = 2.54 cm?
2. A friend in Sao Paulo, Brazil laughing told Mr. Wheeles that it averages 27.2° with a standard deviation of 1.6° and he was going to the beach. Confused at first, Mr. Wheeles remembered that temperature is measured in Celsius in Brazil. If the equation to convert Celsius to Fahrenheit is what is the mean and standard deviation for the temperature in Brazil on February 21?
3. A company selling clothes on the Internet reports that the packages it ships have a median weight of 68 ounces and an IQR of 40 ounces.
   1. The company plans to include a sales flyer weighing 4 ounces in each package. What will the new Median and IQR be?
   2. If the company recorded the shipping weights of these NEW packages in pounds rather than ounces, what would the Median and IQR be? (1 pound = 16 ounces)
4. Here are the summary statistics for the weekly payroll of a small company:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| mean | std dev | min | Q1 | Med | Q3 | Max | IQR |
| 700 | 400 | 300 | 350 | 500 | 950 | 1200 | 600 |

* 1. Suppose business has been good and the company gives every employee a $50 raise. What will the new summary statistics be?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| mean | std dev | min | Q1 | Med | Q3 | Max | IQR |
|  |  |  |  |  |  |  |  |

* 1. Instead, suppose the company decides to give everyone a 10% raise (to do this, multiply by 1.10). What will the new summary statistics be?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| mean | std dev | min | Q1 | Med | Q3 | Max | IQR |
|  |  |  |  |  |  |  |  |

1. A high school senior uses the Internet to get information on SAT tests vs. ACT tests. He is looking at comparing the two tests, and knows that SATs are out of 1600 points (math and verbal only), and ACTs are out of 36 points. Since the two exams use very different scales, comparisons of the two are hard. He finds online that an easy way to compare is:

***SAT = 40 x ACT + 150***.

Here are the summary statistics for ACT scores is his school.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| mean | std dev | min | Q1 | Med | Q3 | Max | IQR |
| 27 | 3 | 19 | 24 | 28 | 30 | 34 | 6 |

Find the comparable SAT scores:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| mean | std dev | min | Q1 | Med | Q3 | Max | IQR |
|  |  |  |  |  |  |  |  |